

**HEART OF ROTARY ENGINE:** Mazda's leadership in the mass production and sale of more than 250,000 rotary engine automobiles is credited with starting the automobile industry's interest in this design. The rotary engine produces about twice the horsepower of a piston engine of equal size and weight and has only a third as many parts. The auto industry's interest in the rotary engine has been increased also by the need to meet stringent federal air pollution standards by the mid-1970s.

## Wankel Vehicle Displayed 45/99

By PAUL J. FRIEDLANDER

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**NEW YORK** — The two most significant items displayed at the recent International Automobile Show in New York's Coliseum were the rotary Wankel engine in the Japanese-built Mazda automobile and the General Motors Experimental Safety Vehicle, in that order of significance.

Together, the two may alter the highway life of the American motorist in the years ahead. The rotary engine may do so more immediately than the safety car because it will change the motorist's traffic driving patterns.

In addition, the rotary engine will make ecologists breathe easier; it already meets California's antipollution requirement for 1974, the strictest in the nation.

More than 20,000 rotary engine Mazdas are now on the West Coast and 90 per cent of their owners said, in a recent, nonpolitical poll, that they would vote to buy another one.

There have been no Mazda dealerships east of the Mississippi, although by the end of summer 80 will be franchised on the Eastern Seaboard. Only a few Eastern motorists have had the opportunity to drive the rotary engine car.

Such an opportunity came my way at the automobile show and it was an illuminating and persuading experience, bearing out most of the claims made for this new engine which may, in a half-dozen years, replace our reciprocating piston engine.

The Mazda Wankel rotary engine, invented by a German and used in mass production by the Japanese under license and soon to be used by General Motors, Ford and several European manufacturers, also under license, is a simplified gasoline engine.

The basic Wankel has a triangular-shaped rotor that compresses the gasoline-air mixture between itself and the eccentric-shaped walls of the chamber in which it rotates. The

mixture is ignited by two conventional spark plugs firing in controlled sequence, the explosion spinning the rotor that transmits this power through direct gears to the flywheel, crankshaft and wheels.

The eight-cylinder reciprocating piston engine has nearly 80 moving parts. These include eight pistons, eight piston rods, 16 valves, 16 lifters, 16 rocker arms, and so on. It shakes and vibrates because in the ordinary passenger-car engine at 20 miles an hour each piston is forced up and down in the cylinder by the internal combustion between 1100 and 1500 times a minute. At 60 miles an hour this figure is 2800 times a minute.

The Wankel rotary engine has only three moving parts, moving always one way in a circular motion. Intake and exhaust ports, not valves, are merely openings in the chamber's side wall. The resultant lack of vibration is evident when you sit in a rotary engine car with the engine going. The car simply does not shake the way a reciprocating-engine car does.

The 120-horsepower, twin-rotor engine in the two-door Mazda sedan runs as smooth as, possibly smoother than, the multicylinder engine of the most expensive reciprocating engine cars now on the road. Not much bigger than a 60-to-90-horsepower compact, it rides and handles like a big car.

When I got the hang of matching the engine's revolutions a minute shown on the tachometer to road speed and correct gear, I found the engine extremely responsive.

The driving technique is different in that for best performance you drive the rotary with one eye on the tachometer, shifting up and down at the proper point on the R.P.M. dial.

There is an automatic transmission but I found the four-speed-forward manual transmission easy to handle, and great fun in traffic.

Near 2000 R.P.M.'s, the engine is slow on take-off, tends to be luggy, although it does not buck, skip or jump like a piston-engine car protesting against this kind of abuse at low speeds. At 3000, you shift quickly and smoothly, waste no time in whirling the engine up to the power you want to move through traffic.

Stripped of its distributors, carburetor, air cleaner and supportive equipment, the twin rotor is half the size and weight of a stripped V-8 piston engine.

Supposedly, you can stack any number of rotors in tandem to build up an engine of great horsepower, enough to move

the biggest American-built sedan and truck.

Rolls-Royce is reported to be working on a diesel-fueled rotary. Mazda will have a small rotary truck here in a few months.

The engine's resistance to driver damage, its few moving parts and low maintenance costs and down-time, should make it the despair of imaginatively high-priced auto mechanics.

The rotary burns lead-free gasoline, can take 60 octane, much lower quality than any gas sold in American today. Gas mileage is not great — 15 to 25 miles a gallon.

Design and operating temperatures of the Mazda engine produce a minimum of nitrogen oxides, 50 per cent below federal emission standards. Nitrous oxides are the worst pollutants from piston engines and also airplane jet engines. They are a major source of smog and lung irritation.



# Filter Inspection Is Urged At Least Each 6000 Miles

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Cutting the oxygen to an automobile engine's carburetor produces immediate, dramatic and costly results in the form of poor performance, low gasoline mileage and high fuel consumption.

A car's basic power comes from combustion of vaporized gasoline within engine cylinders, but ignition will not occur in the absence of air.

B. F. Goodrich, Co. car care specialists estimate that 10,000

gallons of air pass through the carburetor air filter for each gallon of gasoline burned. The filter does exactly what its name implies. It screens the air, preventing dirt, dust and grit from entering the engine and causing expensive damage to upper piston rings and cylinder walls.

Dirt screened by the filter collects and builds up on the filter core at an extremely rapid rate. For the most efficient operation, Goodrich advises that



acts, affiliates of Costello-Florissant in Ferguson. The premises and a warehouse on a long-term basis to individuals and businesses. CK Power Products, Inc., 1111 S. Illinois. Thomas E. Costello is president. Costello is president and general manager.

## California Leads States In Motor Vehicles

More than 112,000,000 motor vehicles are registered in the United States.

The vehicle census report by the Federal Highway Administration shows that of a total of 12,010,000 registrations, passenger automobiles account for 12,082,000.

Truck and bus registrations are estimated at 19,928,000.

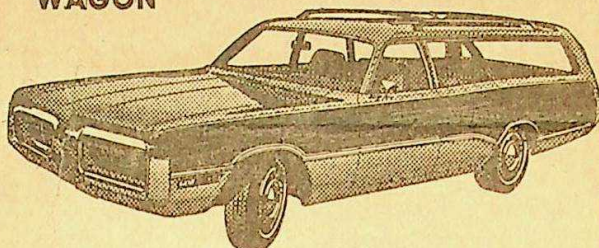
California continued to lead all other states in total vehicle registrations, with 12,300,000. Georgia had the largest percentage growth in vehicle registrations, with 6.3 per cent more registered than in 1970.

## Not Everyone Drives

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2 seat, power tailgate window, rear air deflector, power steering, automatic transmission, power disc brakes, 360 V-8 engine, tinted glass all around, factory air conditioned, radio, inside hood release, drip rail mouldings, Honey dew with tan vinyl trim.

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## IN EUROPE, WHERE THEY'VE BEEN BUYING FOR THREE GENERATIONS, THEY BUY MORE FIATS THAN

For every Volkswagen sold in Italy, 6 Fiats are sold in Germany. For every Renault sold in Italy, 2 Fiats are sold in France. For every Volvo sold in Italy, 9 Fiats are sold in Sweden. And this becomes even more meaningful when you consider that there, they have fifty different kinds of cars to choose from. And that their choice is based on sixty years of experience with various cars under conditions that run all the way from

the sub-zero winter to the traffic jams of the German autobahn.





# Rotary Engine Likely To Change Our Autos

© New York Times  
Dispatch To The Sentinel

NEW YORK — The two most significant items displayed at the recent international automobile show in New York's coliseum were the rotary Wankel engine in the Japanese-built Mazda automobile and the General Motors Experimental Safety Vehicle, in that order of significance.

Together, the two may alter the highway life of the American motorist in the years ahead, the rotary engine more immediately than the safety car for it will change his traffic driving patterns. In addition, the rotary engine will make ecologists breathe easier; it already meets California's antipollution requirement for 1974, the strictest in the nation.

MORE THAN 20,000 rotary engine Mazdas are now tootling around on the west coast and 90 per cent of their owners said, in a recent, nonpolitical poll, that they would vote to buy another one.

The automobile show was an illuminating and persuading experience, bearing out most of the claims made for this new engine which may, in a half-dozen years, replace the reciprocating piston engine.

The Mazda Wankel rotary engine, invented by a German and used in mass production by the Japanese under license and soon to be used by General Motors, Ford and several European manufacturers, also under license, is a simplified gasoline engine.

THE BASIC Wankel has a triangularly shaped rotor that compresses the gasoline-air mixture between itself and the eccentric-shaped walls of the chamber in which it rotates. The mixture is ignited by two conventional spark plugs firing in controlled sequence, the explosion spinning the rotor which transmits this power through direct gears to the fly-

wheel, crankshaft and wheels.

The eight-cylinder reciprocating piston engine has nearly 80 moving parts in the way of eight pistons, eight piston rods, 16 valves, 16 lifters, 16 rocker arms, and so on. It shakes and vibrates because in the ordinary passenger-car engine at 30 miles an hour each piston is forced up and down in the cylinder by the internal combustion between 1,100 and 1,500 times a minute. At 60 miles an hour, this figure reaches 2,800 times a minute.

THE WANKEL rotary engine has only three moving parts, moving always one way in a circular motion. Intake and exhaust ports (not valves) are merely openings in the chamber's sidewall. The resultant lack of vibration is evident when you sit in a rotary engine car with the engine going — the car simply does not shake the way a reciprocating-engine car does.

The 120-horsepower, twin-rotor engine in the \$3,000, two-door Mazda sedan runs as smooth as, possibly smoother than, the multicylinder engine of the most expensive reciprocating engine cars now on the road. Not much bigger than a 60-to-90 horsepower compact, it rides and handles like a big car.

THE DRIVING technique is different in that for best performance you drive the rotary with one eye on the tachometer, shifting up and down at the proper point on the R.P.M. dial.

Near 2,000 R.P.M.'s, the engine is slow on take-off, tends to be logy, although it does not buck, skip or jump like a piston-engine car protesting this kind of abuse at low speeds. At 3,000 you shift quickly and smoothly, waste no time in whirling the engine up to the power you want to move through traffic.

Stripped of its distributors, carburetor, air cleaner and supportive equipment, the twin rotor is half the size and weight of a stripped V-8 piston engine.



the spray in  
size, inti-  
odorant.

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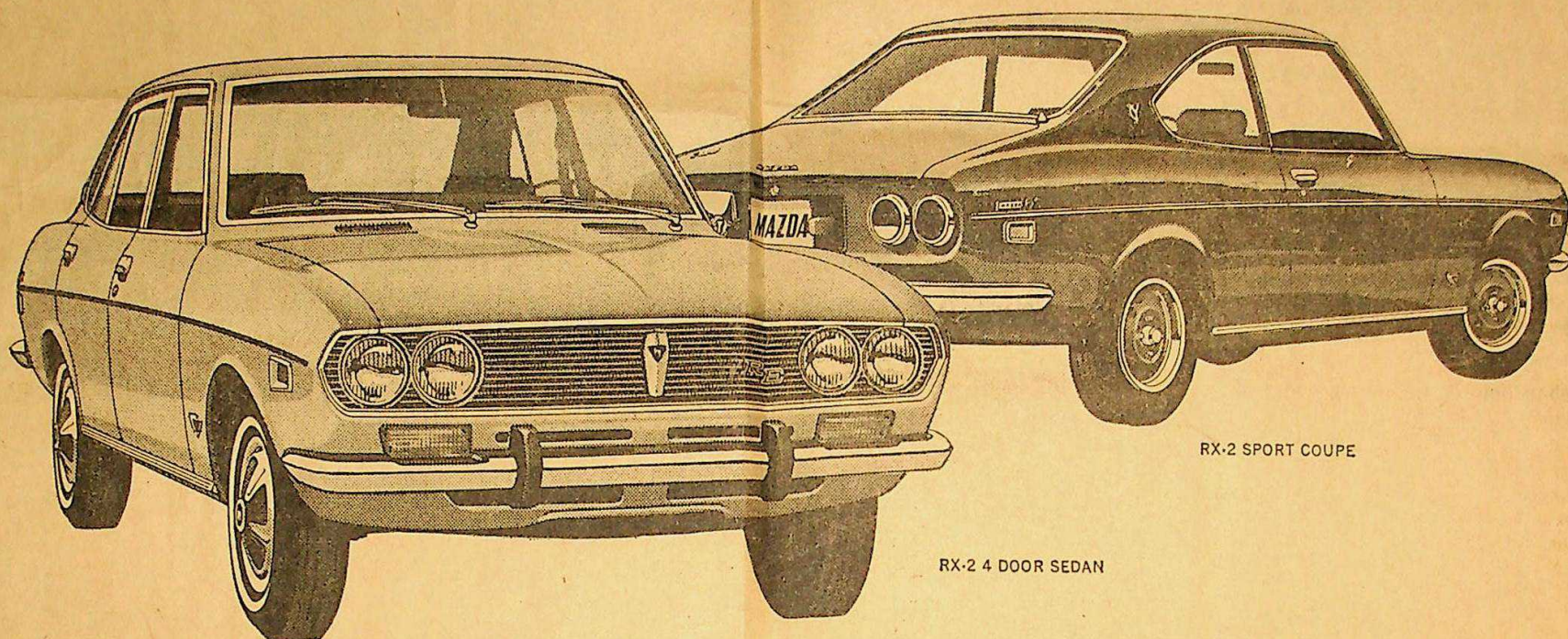
**TEN  
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RX-2 SPORT COUPE

RX-2 4 DOOR SEDAN

451/99

**If the engine in these cars  
had been invented  
before the engine in your car,  
the engine in your car  
would never have  
been invented.**

The car is a Mazda RX-2, with the rotary engine. Powerful. Ruggedly durable. Smooth, silent, because its design is so simple. Fewer moving engine parts to go wrong or repair. In fact, the rotary is so great an advance over ordinary engines that some experts predict all car engines will be rotaries in time.

Now that Mazda has proved the rotary engine idea in over 250,000 cars, manufacturers around the world are rushing to get aboard the bandwagon. Meanwhile, you can get aboard a Mazda now. At your nearest Mazda dealer.



The rotary engine people.

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**Ken Palmer's Daytona Mazda**  
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**Lyles Mazda**  
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